



Coalition C2/Multinational Information Sharing: Current Capabilities and Challenges

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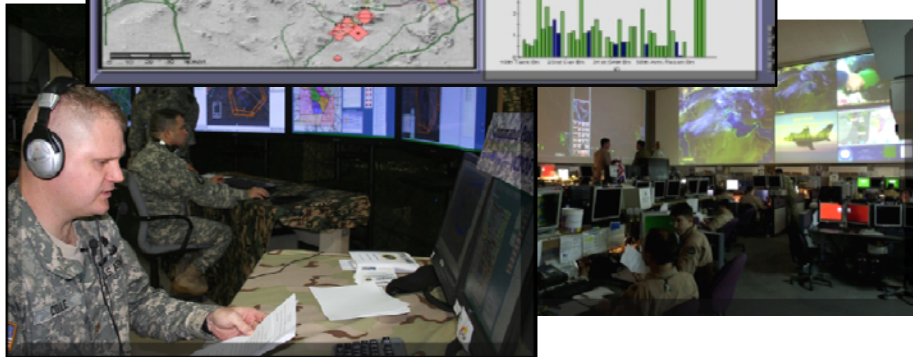
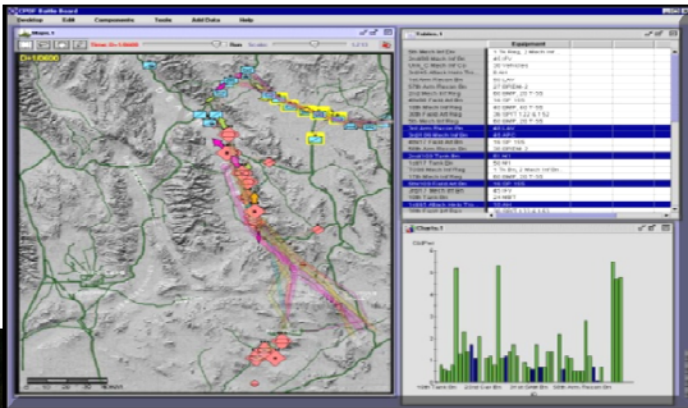
Overview

- ***DoD C2 Background***
- ***Coalition C2 and Multinational Information Sharing (MNIS) Capabilities***
- ***C2 Challenges***
- ***Key Initiatives***
- ***Summary***

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Command and Control (C2)

The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. C2 functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.



Command and Control System
The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned and attached forces pursuant to the missions assigned.



C2 Joint Capability Area (C2 JCA)

(Tier 1 and Tier 2)

Tier 1

C2

C2: The ability to exercise authority and direction by a properly designated commander or decision maker over assigned and attached forces and resources in the accomplishment of the mission.

Organize

Organize: The ability to align or synchronize interdependent and disparate entities, including their associated processes and capabilities to achieve unity of effort

Understand

Understand: The ability to individually and collectively comprehend the implications of the character, nature, or subtleties of information about the environment and situation to aid decision-making

Planning

Planning: The ability to establish a framework to employ resources to achieve a desired outcome or effect

Decide

Decide: The ability to select a course of action informed and influenced by the understanding of the environment or a given situation

Direct

Direct: The ability to employ resources to achieve an objective

Monitor

Monitor: The ability to adequately observe and assess events/effects of a decision.

Tier 2



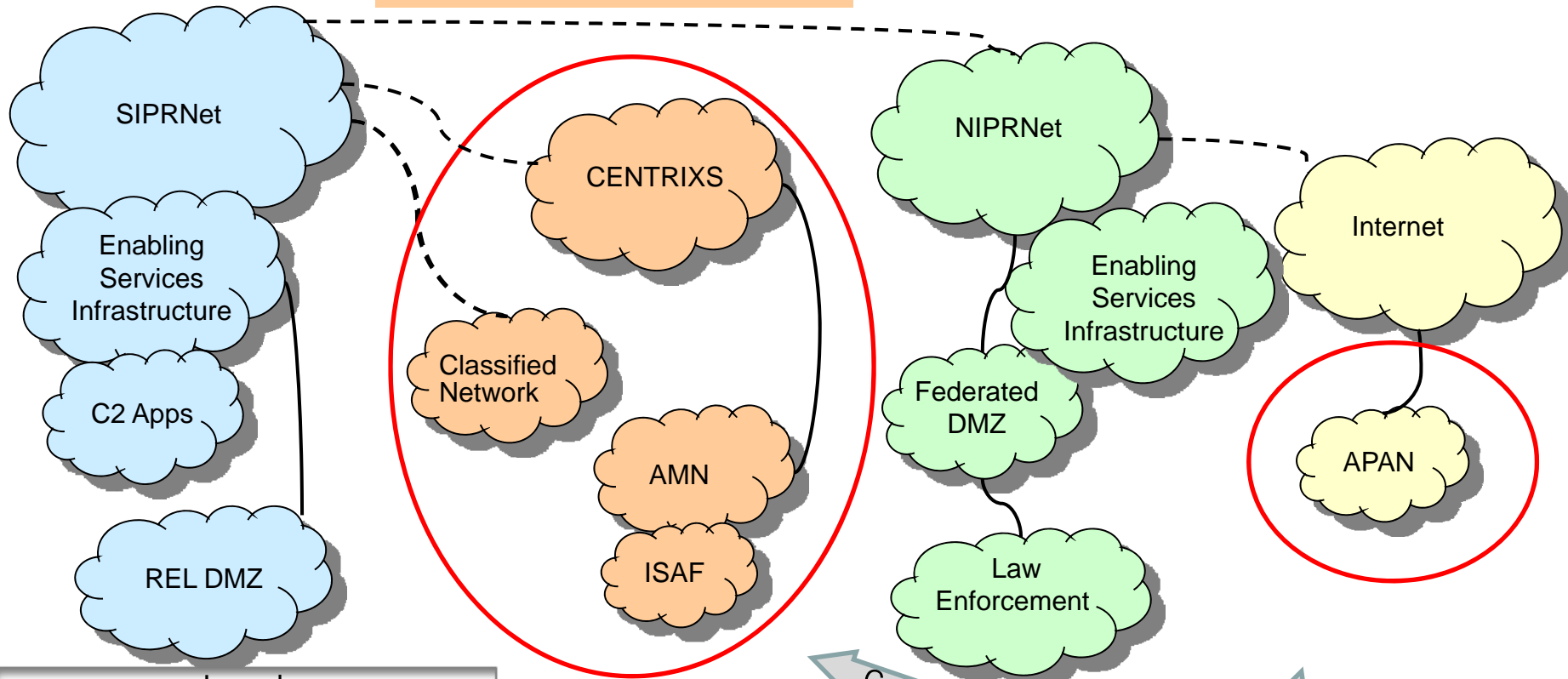
C2 Information Sharing Space

SIPRNet

Multinational Information Sharing
(MNIS)

NIPRNet

Internet / UISC



Legend

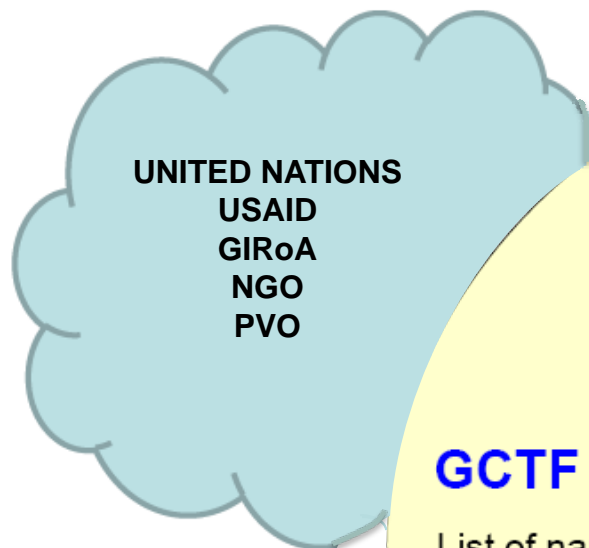
- Cross Domain Guards - - - - -
- Associated Efforts - - - - -
- AMN – Afghan Mission Network
- CDS – Cross Domain Solutions
- DMZ – Demilitarized Zone
- ISAF – International Security Assistance Force
- UISC – Unclass Information Sharing Capability

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Major Coalition Information Sharing

MNIS and Other Mission Partners



GCTF (90)

List of names
classified

Legend

- GICoA – Government of the Islamic Republic of Afghanistan
- NGO – Non-Governmental Organizations
- PVO – Private Volunteer Organization
- USAID – US Agency for International Development

ISAF (48)

ARMENIA
AUSTRALIA
AUSTRIA
AZERBAIJAN
BOSNIA-HERZEGOVINA
FINLAND
GEORGIA
IRELAND
JORDAN
MACEDONIA
MALAYSIA
MONGOLIA
MONTENEGRO
NEW ZEALAND
SINGAPORE
S. KOREA
SWEDEN
TONGA
UKRAINE

NEW ZEALAND

CCEB (5)

AUSTRALIA
CANADA
UNITED KINGDOM
UNITED STATES

MIC (7)

FRANCE
GERMANY
ITALY

NATO (28)

ALBANIA
BELGIUM
BULGARIA
CANADA
CROATIA
CZECH REPUBLIC
DENMARK
ESTONIA
FRANCE
GERMANY
GREECE
HUNGARY
ICELAND
ITALY
LATVIA
LITHUANIA
LUXEMBOURG
NETHERLANDS
NORWAY
POLAND
PORTUGAL
ROMANIA
SLOVAKIA
SLOVENIA
SPAIN
TURKEY
UNITED KINGDOM
UNITED STATES
NATO

Other Mission Partners – Federal, State, Local, Tribal, Industry, NGOs



Current MNIS C2 Information Sharing Systems

- ***Under MNIS, DoD develops, fields, and sustains capabilities for US and coalition operational information sharing at the Secret Releasable through Unclassified Public Domain levels***
 - Combined Enterprise Regional Information Exchange System (CENTRIXS)
 - Combined Federated Battle Laboratory Network (CFBLNet)
 - Unclassified Information Sharing Capability (UISC)



CENTRIXS Today



- A combination of separate multilateral & bilateral networks
- Allows U.S. and mission partner nations & their forces to securely share mission-specific information
- Supports local, regional, and global combined operations including OEF, OIF, GWOT & counter-narcotics
- Regionally focused, COCOM centric

- 50+ CENTRIXS/coalition networks
- 150+ sites/locations worldwide
- Each network is cryptographically isolated (Type 1 or VPN over GCTF)
- Larger networks have full range of services with cross-domain solutions
- Many smaller bilateral networks have limited services (e.g., FTP, email)



GCTF Global Counter Terrorism Force
VDNI Virtual Private Network

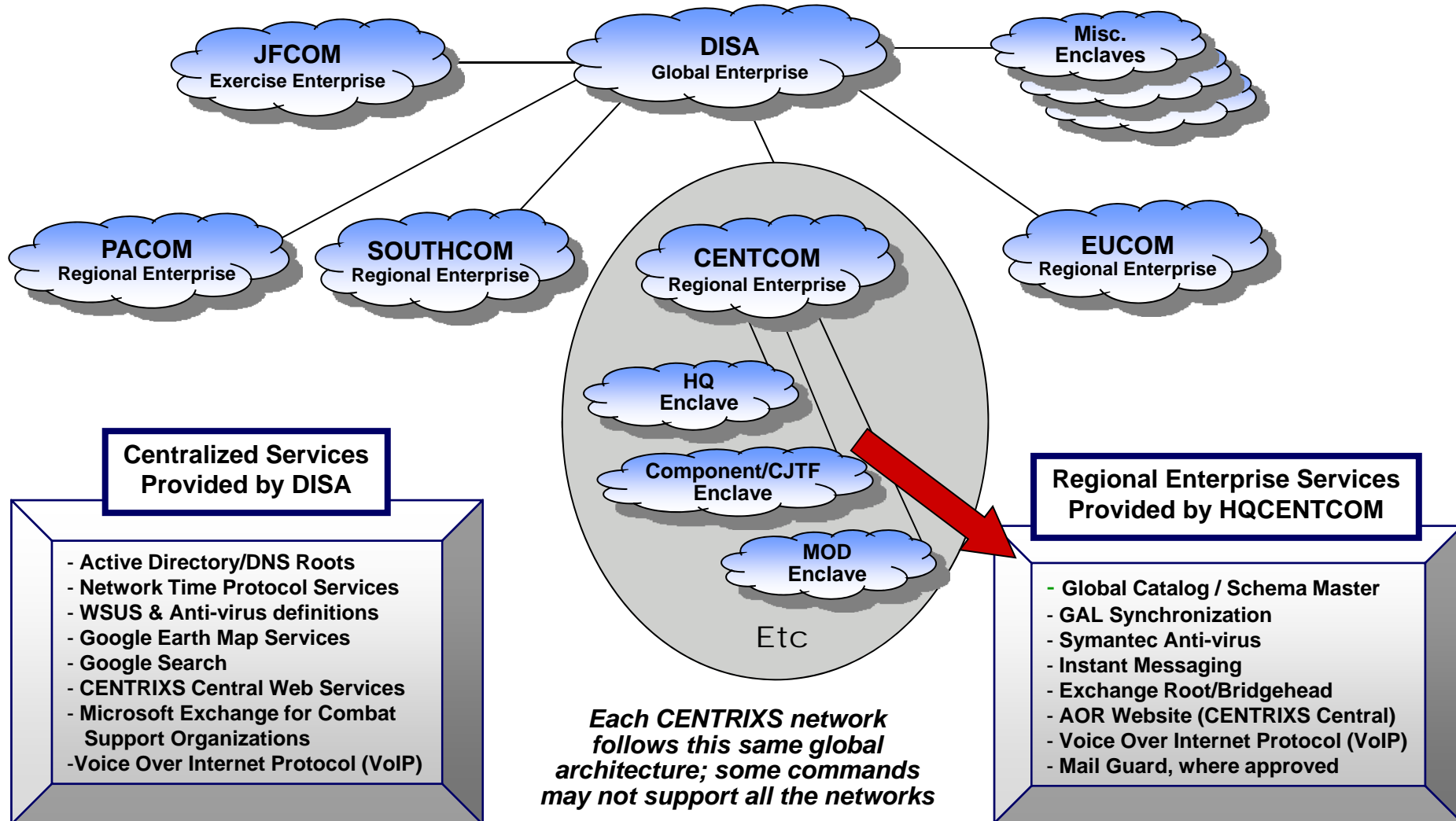
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What CENTRIXS Is

Global Operations (GCTF View)

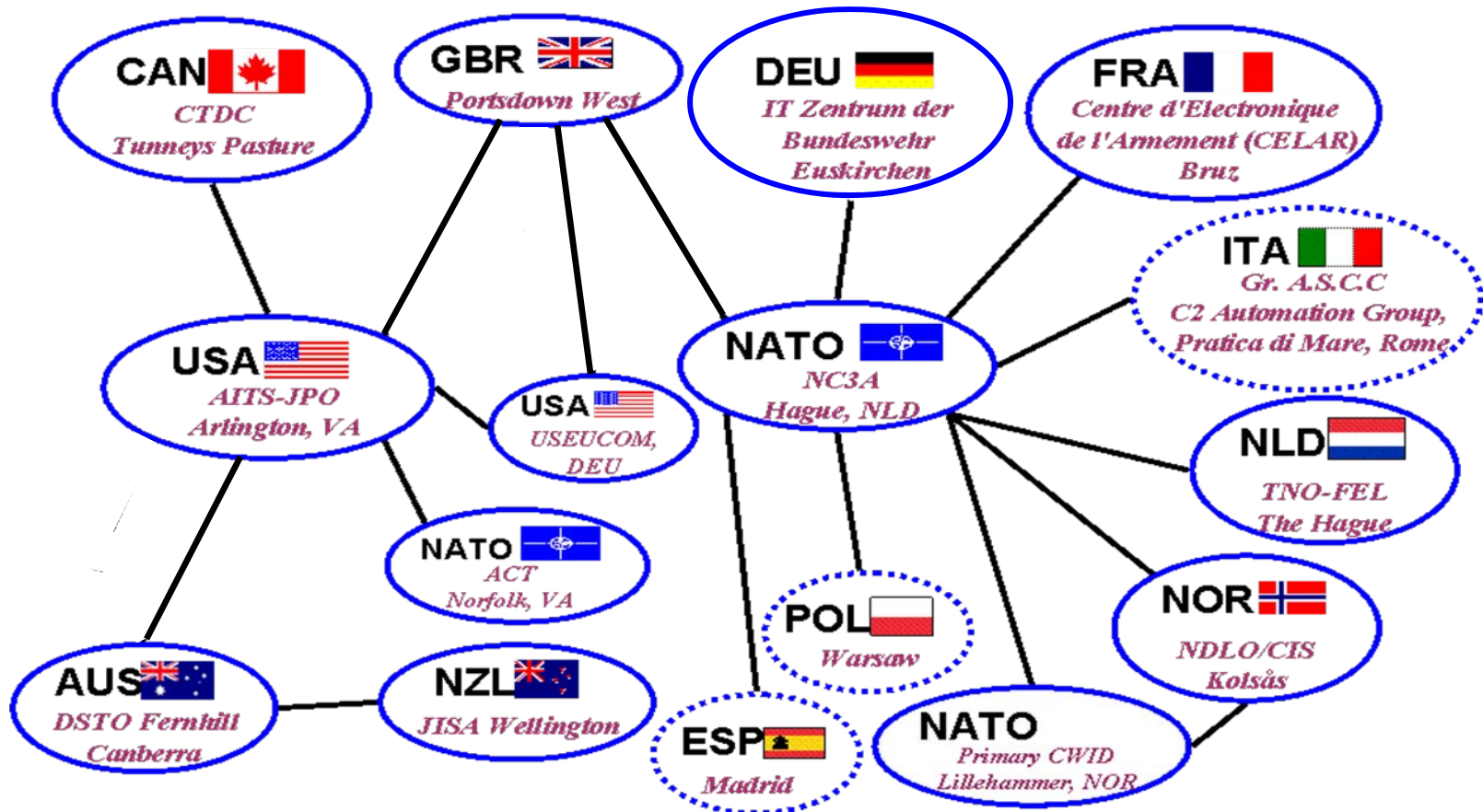


CENTRIXs is global reaching – supported by multiple COCOMs





CFBLNet



A controlled Trials and Assessment capability for U.S. and coalition forces to assess secret level C2 technologies in a simulated operational environment



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Unclassified Information Sharing (UIS)

Communities Of Interest (COI)



All Partners Access Network:

- Enables professional networking and communication
- Establishes pre-defined communications channels, relationships and information workflows
- Increases situational awareness
- Provides an environment for sharing lessons learned and best practices
- Encourages cross-organizational knowledge management and information transparency

Knowledge Domains:

- Security cooperation
- Crisis response
- Humanitarian assistance / disaster relief
- Training and exercises

Information exchange and collaboration between the US DoD and any external country, organization, agency or individual that does not have access to traditional DoD systems and networks

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MNIS Challenges

Current State/Challenges

- Multiple organizations within a COI host their own applications and services
- Limited coalition application / service interoperability
- Limited service scalability based on class and quality of service

- Regional data management with organization unique governance
- No metadata / IA attribute tagging
- COI unique data semantics require ambiguity resolution

- Each COI manages its own independent network and physical infrastructure
- Locally managed username / password access control
- Unique network architecture and devices for each organization

Applications / Services



Objective State

- Enterprise provisioned applications / services (i.e. Situational Awareness, Planning, Chat, etc.)
- Widgets (i.e. visualization of data, etc.)

Data



- Globally managed trusted metadata tags enable policy based COI data sharing
- Data warehouses for COI data
- Visible, accessible, understandable data conformance with Net Centric Data Strategy

Infrastructure



- Attribute based policy enforcement
- Converge physical infrastructure at Enterprise Computing Nodes
- Enterprise Identity Management for coalition environment

Leverage enterprise services and incrementally deliver capabilities



Coalition C2 Challenges

- ***Governance – common adjudication authority***
- ***Policy – common set of rules/guidelines***
- ***Agreement/Commonality***
 - Purpose/Application
 - Security – Information Assurance, Identity Management, Cross Domain Solutions
 - Technology
 - Resources and Commitment – uniting resources in common direction, long term continuity
- ***Dynamic policy/agreement/rules application***
 - Key Initiatives
 - Data Strategy
 - Services Strategy
 - Objective and Transition Architectures

Not all elements are technical in nature



Way Forward - Key Initiatives

- ***Achieving the Net-Centric Vision*** – Creating net-centric capabilities
- ***DoD Net-Centric Data Strategy***
 - Identify and expose Authoritative Data Sources (ADS)
 - Publish in a common format to support flexible implementation
 - Develop a common data exchange standard (C2 Core) as an extension from Universal Core (non-proprietary, open source)
- ***DoD Net-Centric Services Strategy***
 - Maximize Use of Mandated Core and Shared Enterprise Services
 - Identify and provision C2 Common Services
- ***Joint Mission Threads*** – An essential element to understand the context of how we C2
- ***C2 Functional Capability Services***
 - Intent is to sustain and synchronize current C2 capabilities
 - Incremental vice evolutionary delivery of capability
- ***Joint C2 Objective Architecture*** – Software View, Data View, Standards Profile

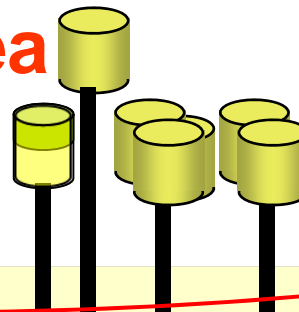


Achieving the Net-Centric Vision

Creating net-centric capabilities involves combining the specialized information production, consumption and display features of functional mission areas with the ability to publish, subscribe, aggregate and manage at the Enterprise Level

C2 Focus is in this area

Applications
and Data



Provided by
Programs in
various
functional
mission areas

Core
Enterprise
Services

- Enterprise Systems Management
- Discovery
- Mediation
- Collaboration
- User Assist
- IA/Security
- Content Staging
- Application
- Messaging
- etc.

Provided
by NCES and
other
infrastructure
programs

IP-based
Transport

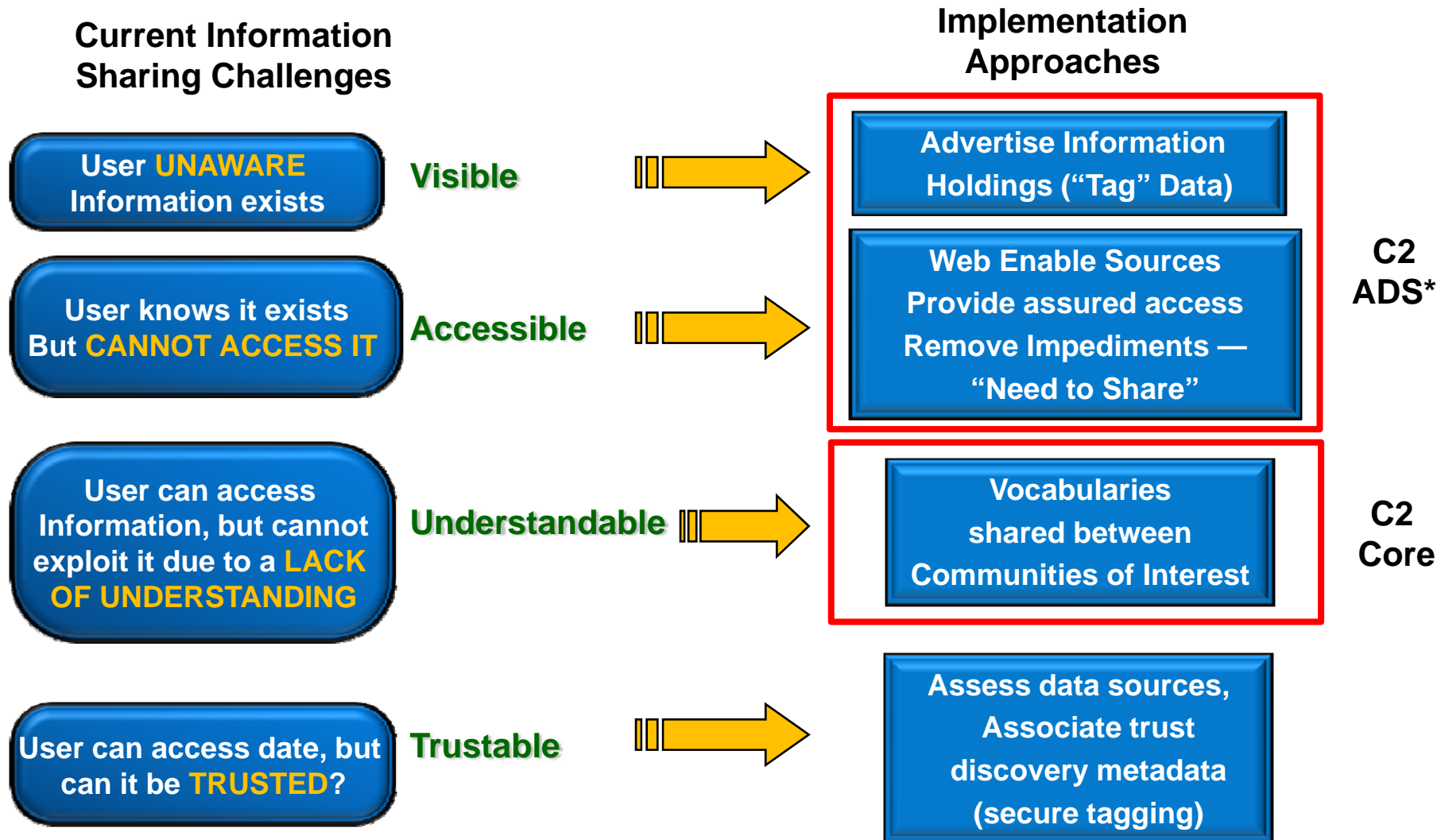
Defense Information Systems Network (DISN)
Secret Internet Protocol Router Network (SIPRNet)
Joint Tactical Radio System (JTRS)
Warfighter Information Network – Tactical (WIN-T)
Etc.

Provided
by Comms
programs

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DoD Net-Centric Data Strategy

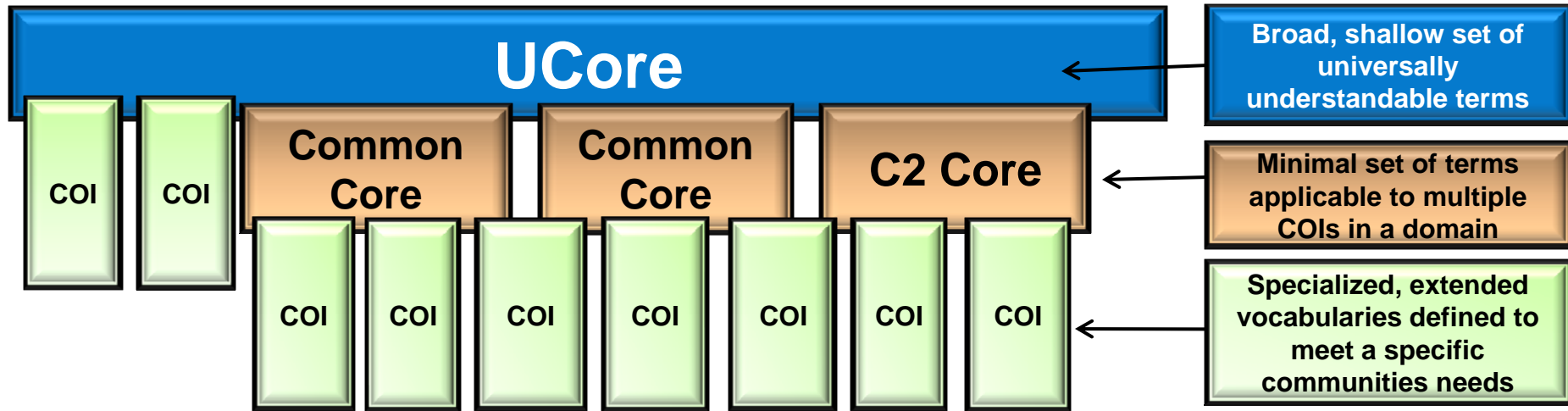


* ADS: Authoritative Data Source

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C2 Core

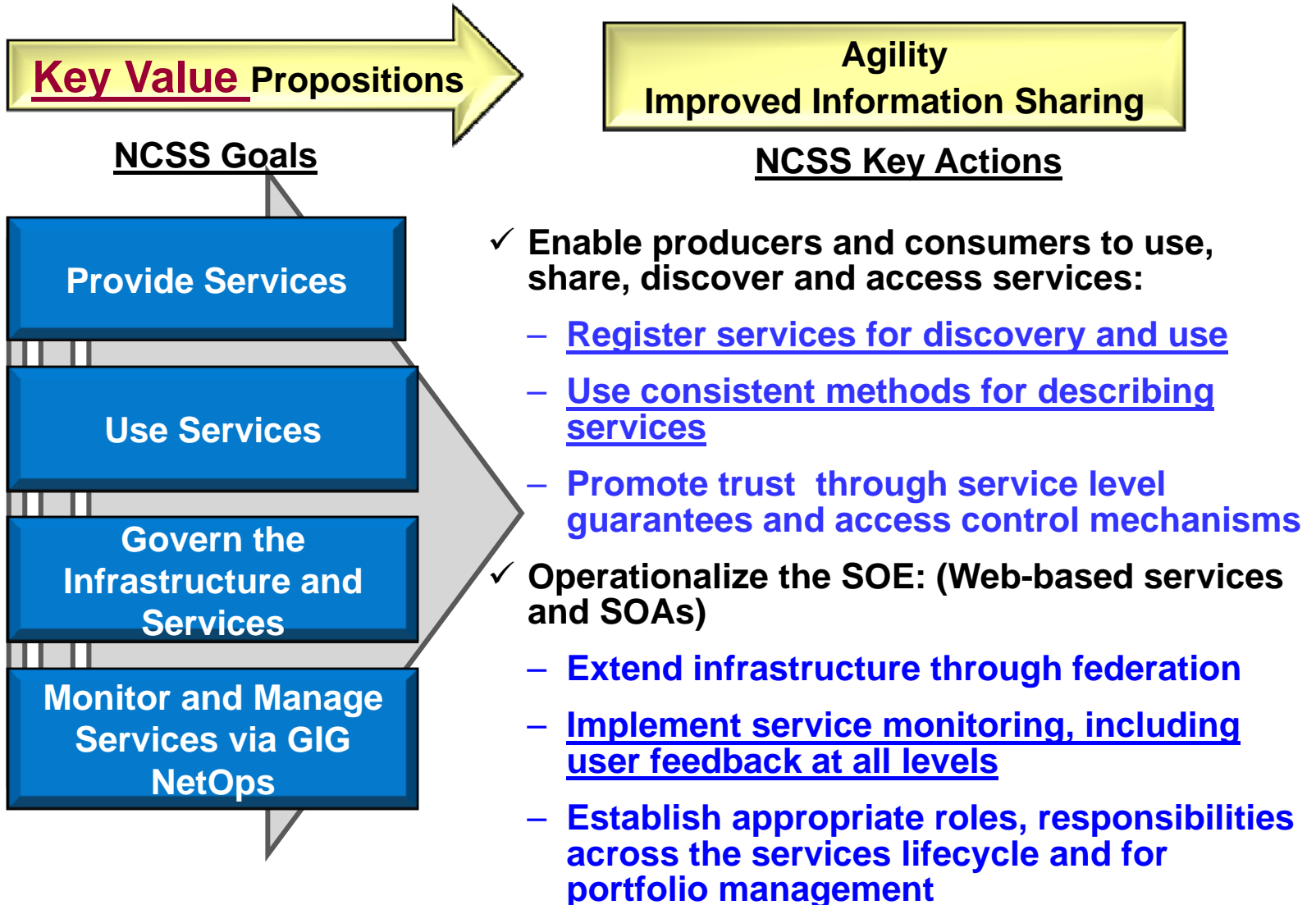


C2 Core simplifies C2 information exchanges through agreement on:

- Data element definitions common to many Communities of Interest (COIs)
- Technical structure of Information Exchange Specifications (IES) supporting C2 information needs
- Leverages Universal Core (UCore) through extension of its Who, What, When and Where (4W) elements



DoD Net-Centric Services Strategy





Joint Mission Threads

- ***Joint Mission Thread (JMT): an operational and technical description of the end-to-end set of activities and systems that accomplish the execution of a joint mission***
- ***Provides the Context of C2 activities and needs***
 - Tier 1 comprises overall systems, information exchanges, activities performed, nodes, need-lines, and actors
 - Tier 2 “strands” represent of detailed breakdowns, with supporting reusable data
 - Tier 3 is a conceptual and organizational construct to address specific testing and certification requirements as they emerge



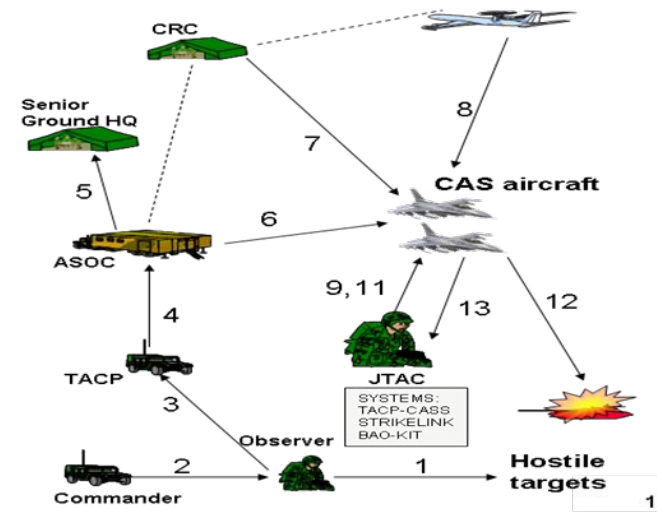
Joint Mission Threads

- ***Joint Mission Threads (JMTs) help us to understand:***

- Interoperability issues
- Capability gaps

- ***JMTs can be used for:***

- Interoperability Testing and Evaluation (T&E)
- Training Exercises and mission rehearsals

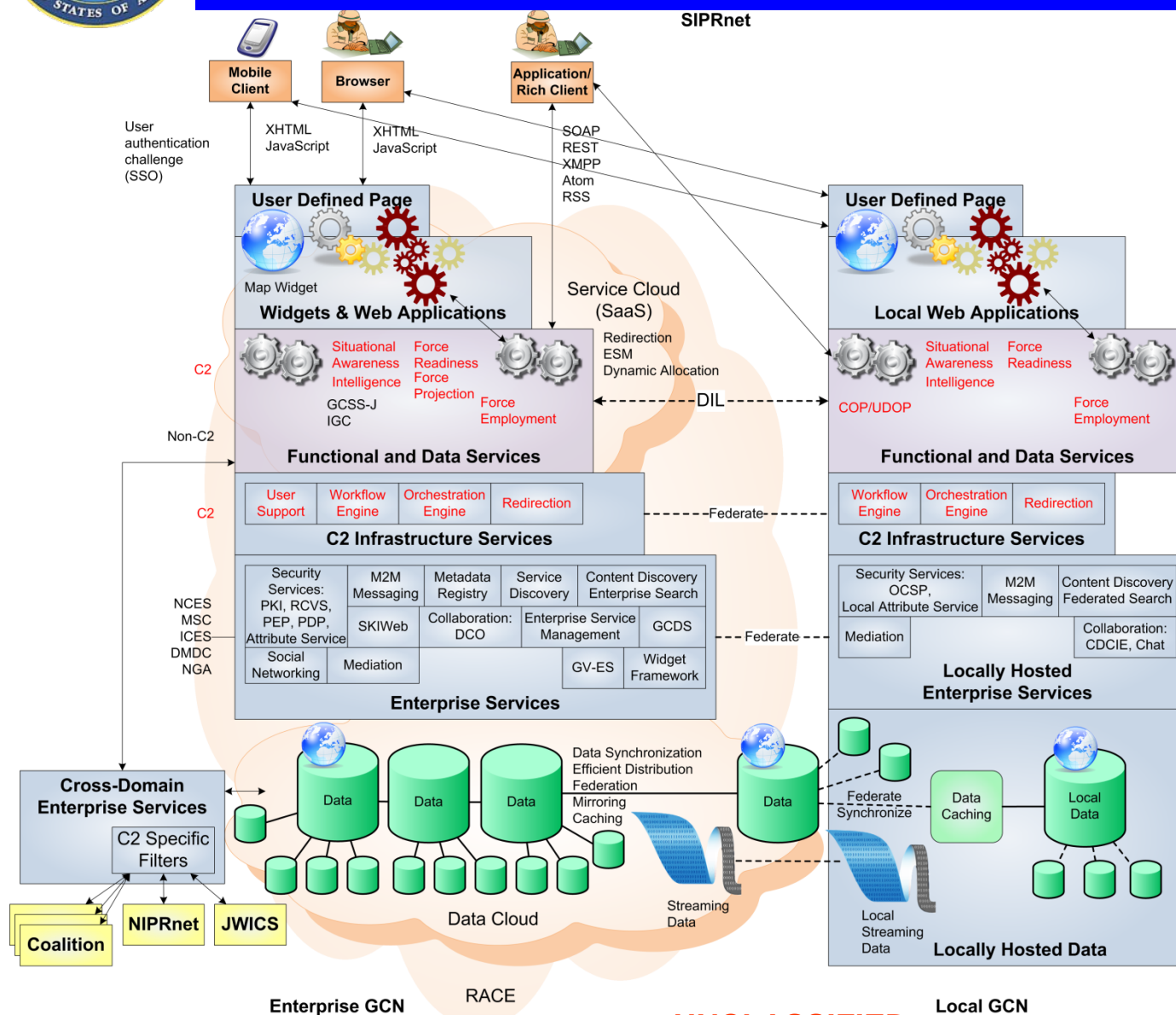


- ***Analysis of Joint Close Air Support JMT identified:***

- Gaps in procedures – Services had different joint request procedures
- Joint Terminal Attack Controllers had very different digital implementations (message formats, wave forms)



Joint C2 Objective Architecture: Software View



Acronyms

CDCIE = Cross Domain Collaborative Information Environment
CDES = Cross-Domain Enterprise Services
DIA = Defense Intelligence Agency
DIL = Disconnected Operations, Intermittent Connectivity, Limited Communications
DMDC = Defense Manpower Data Center
DoDIIS = Department of Defense Intelligence Information System
GCCS-J = Global Command and Control System - Joint
GCDS = GIG Content Delivery Service
GES = GIG Enterprise Services
GIG = Global Information Grid
GTN = Global Transportation Network
GV-ES = Geospatial Visualization - Enterprise Service
ICES = Intelligence Community Enterprise Services
IGC = IDE/GTN (Integrated Development Environment/Global Transportation Network) Convergence
MNIS = Multi-National Information Sharing
MSC = Multi-Service SOA Consortium
NCES = Net-Centric Enterprise Services
NGA = National Geospatial-Intelligence Agency
PDP = Policy Decision Point
PEP = Policy Enforcement Point
PKI = Public Key Infrastructure
RACE = Rapid Access Computing Environment (DISA)
RCVS = Robust Certificate Validation Service
SaaS = Software as a Service 22



The Bottom Line

- ***Ultimately a Human Endeavor***
 - Technology enables the human interface and supports “command” and the decision maker, rather than forcing the decision maker to operate within the constraints of the “control” technology
- ***Information Age Makes it...***
 - More Important and More Challenging....with Great Opportunity
- ***Must Support the Way We Fight***
 - Joint, Allies and Coalition
 - Requires Trust
- ***Must Work Enterprise Solutions***
 - Processes for Collaboration and Consensus Building
 - Promote Improved Information Sharing Among Mission Partners



Questions and Discussion